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Insights on Natural Products as Antischizophrenic Medication: State of the art

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ABSTRACT: Schizophrenia is one of the most common chronic psychiatric illnesses, affecting 1% of the global population. Despite its societal impact, the aetiology of schizophrenia is still unknown. Currently available medications primarily treat positive symptoms, with little or no effect on negative and related cognitive symptoms, which have a significant impact on functional outcomes in schizophrenia. Dizziness, diabetes, weight gain, tardive dyskinesia, neuroleptic malignant syndrome, sexual dysfunction, agitation, and sedation are some of the significant side effects of currently accessible marketed antipsychotic medications. There is no effective treatment for the prevention and management of psychosis. As a result, demand for herbal treatment is rising. This article compiles information on plants that may help with psychotic symptoms without side effects. This work gives insights on antipsychotic plants, their biological sources, common names, and other biological functions, which will help researchers in developing new antipsychotic herbal therapeutics.

KEYWORDS: Psychosis, Anti-psychotic drugs, Anti-psychotic plants.

I. INTRODUCTION

Schizophrenia is one of the most severe and incapacitating mental illnesses. Delusional thoughts, strange sensory experiences, disorganised speech and behaviours, as well as apathy and emotional flatness are all hallmarks of schizophrenia [1]. Social functioning problems, such as trouble establishing and maintaining interpersonal relationships, problems working or performing other instrumental duties (e.g., student, homemaker, employee), and difficulties caring for oneself, are all symptoms of schizophrenia [2]. Many people living with the illness relies on others to supply their basic necessities. According to estimates from research conducted in Europe and the United States, between 25% and 60% of people with schizophrenia live with relatives, with an even larger number relying significantly on relatives for daily care. Individuals who do not have family support frequently turn to mental health, residential, and case management services to meet their fundamental requirements [3]. Persons with schizophrenia who have insufficient interaction with relatives and fall through the cracks in the social care delivery system wind up in hospitals, jail, or become victimised or homeless in the worst-case scenario [4]. The treatment of schizophrenia accounts for over 25% of all inpatient hospital beds, and the expense of treating schizophrenia in the United States is estimated to be over 63 billion dollars per year [5]. In terms of illness-adjusted life years, schizophrenia is one of the top 10 most debilitating disorders in the world. With unemployment rates nearing 75%, one of the most significant costs is a lack of productivity over a career. Unfortunately, even with the best treatment, many people continue to have significant impairments for the rest of their lives [6].

The actual roots of schizophrenia are unknown, however it is thought to have existed in various forms for ages, with historical evidence dating back to Ancient Egypt. Many people suffering from psychosis were thought to be possessed or under the control of hostile gods or spirits [7]. The earliest complete description of schizophrenia was written by John Haslam, the resident apothecary at Bedlam Hospital in London, UK, on a patient named James Tilley Matthews, who developed paranoid delusions about 1810 [8]. Matthews claimed he was being tortured and manipulated by a band of London-area criminals trained in 'pneumatic chemistry' utilising an air loom [8]. In the 1880s, German Psychiatrist Emil Kraepelin proposed that schizophrenia, or 'dementia praecox,' was a unique mental ailment rather than a kind of manic depression, cementing its status as a formal mental disorder [9]. The term "schizophrenia," which means "divided mind," was coined by Swiss psychiatrist Eugen Bleuler in 1911. Bleuler considered schizophrenia to be a collection of illnesses, referring to them as 'the schizophrenias' [10].

Schizophrenia affects more than 50 million people worldwide. Schizophrenia affects an estimated 2.2 million people in the United States. The general population has a lifetime prevalence rate of roughly 1% for acquiring



schizophrenia. Schizophrenia is thought to have a relatively constant prevalence rate (varying between 0.5 and 1.0 percent) across a wide range of populations and civilizations. There has been little variation in schizophrenia rates by gender, race, religion, or level of industrialization. There is evidence, however, that schizophrenia is more prevalent in metropolitan areas of developed countries, and that those from poor or third-world countries may have a better prognosis and course of illness. Schizophrenia can strike at any age, but it is most common in people aged 16 to 30. For men, the peak age of onset is 20 while for women, it is 24. Childhood-onset schizophrenia (in children under the age of 10) is uncommon and contentious at the moment. After the age of 40, some people, mostly women, develop symptoms of schizophrenia, which is thought to be exacerbated by low oestrogen levels during menopause (schizophrenia after the age of 40 is often called late onset schizophrenia). Men are 1.5–2 times more likely than women to develop schizophrenia, and men have more severe cases and poorer functional recovery over time. Women are less likely to spend time in hospitals, have less unpleasant symptoms, and show less cognitive impairment than men. In comparison to men with the condition, women spend less time in hospitals, have less unpleasant symptoms, show less cognitive impairment, and have superior social competence and social functioning.

II. MEDICINAL PLANTS AS SCHIZOPHRENIC DRUGS

Antipsychotic medications are sometimes known as neuroleptic medicines, or neuroleptics, a phrase borrowed from Greek, where neuro refers to “nerves” and lept means “to grasp.” As a result, the term “neuroleptic” refers to a drug that “takes hold of one’s nerves [11].” Antipsychotic drugs are useful in the treatment of hallucinations, delusions, and mental abnormalities and are used in the acute and maintenance treatment of schizophrenia. Antipsychotic drugs are usually divided into two groups: first generation (typical) and second generation (atypical). Antipsychotics of the first generation (typical): The first antipsychotic medicine was chlorpromazine, a phenothiazine originally created as a surgical anaesthetic. Soon after chlorpromazine was developed, another antipsychotic medicine, reserpine, a product of the rauwolfia plant, was introduced. Chlorpromazine, triflupromazine, thioridazine, trifluoperazine, fluphenazine, haloperidol, trifluoperidol, penfluridol, flupenthixol and pimozide are examples of antipsychotic medications (**Figure 1**). Clozapine, risperidone, olanzapine, aripiprazole, quetiapine, ziprasidone, and sulpiride are second-generation (atypical) antipsychotics. Atypical antipsychotics are classed based on their pharmacological effects, while typical antipsychotics are classified based on their chemical structure [12]. The primary distinction between the two types of antipsychotics is that the first-generation medications block dopamine while the second-generation meds also influence serotonin levels [13]. When compared to traditional antipsychotics, atypical antipsychotics are typically thought to be more effective and have fewer adverse effects. Some second-generation medications appear to have milder movement-related side effects than first-generation treatments, according to evidence. Antipsychotics of the second generation are usually the first line of treatment for schizophrenia. Clozapine is unique in that it often works even when other drugs have failed; yet, it is rarely the first choice for treatment because it requires monitoring of white blood cell counts [14]. Dizziness, hyperglycemia, weight gain, tardive dyskinesia, neuroleptic malignant syndrome, sexual dysfunction, agitation, and sedation are some of the side effects of synthetic anti-psychotic medicines [15]. The necessity for a constant quest for safe natural therapies is pressing. Herbal medications are in significant demand for primary healthcare in both developed and developing countries due to their wide range of therapeutic actions, higher safety margins, and lower costs (**Table 1**). Dietary supplements, in combination with herbal drugs, may help to alleviate psychotic symptoms.

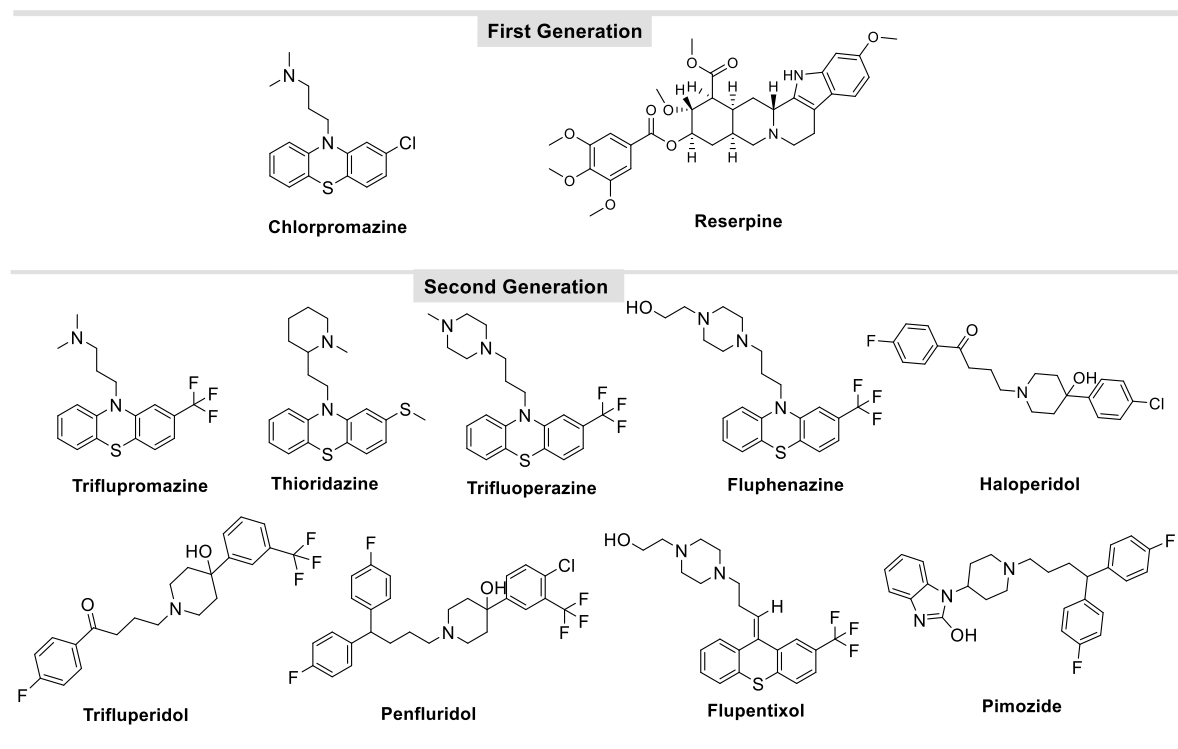


Figure 1: Some marketed antipsychotic drugs

Table 1: Schizophrenic potential of some medicinal plants

Plant Name	Common Name	Other biological activities	Ref
Acorus gramineus	Japanese sweet flag	Insecticidal and anti-fungal	[16]
Albizia in piñata	Maloxo	Hypotensive and vasorelaxant	[17]
Aegle marmelos	Bael	Analgesic, anti-inflammatory, anti-pyretic, anti-cancer, anti-oxidant, anti-ulcer, anti-diabetic, anti-thyroid, anti-viral, anti-bacterial, and anti-fungal	[18]
Allium cepa	Onion	Anti-hypercholesterolemic, hypoglycemic, anti-platelets, anti-oxidant, anti-cancer, and anti-microbial	[19]
Alstonia scholaris	Devil tree	Anti-depressant, anti-anxiety, anti-oxidant, analgesic, anti-inflammatory, anti-microbial, anti-diarrheal, hepatoprotective, anti-cancer, anti-diabetic, and anti-arthritis	[20]
Amblygonocarpus andongensis	Scotsman's rattle	Anti-nociceptive, anti-inflammatory, and anti-microbial	[21]
Areca catechu	Betel nut	Anti-microbial, anthelmintic, and anti-oxidant	[22]
Bauhinia tomentosa L	Yellow bell	Anti-oxidant, anti-fungal, anti-hyperglycemic, and anti-inflammation	[23]
Bryosonima crassifolia	Nanche	Wound healing, anti-inflammatory, anti-oxidant, hypoglycemic, and anti-microbial	[24]
Cannabis sativa	Marijuana	Anti-epileptic, anti-pyretic, anti-parasitic, and anti-emetic	[25]

Catunargaom Spinosa	Mountain pomegranate	Anti-bacterial, anti-fungal, and anti-viral	[26]
Chrysanthellum indicum Linn.	Rariyar kasa	Anti-tumor, anti-amoebic, diuretic, hypoglycemic, and anti-oxidant	[27]
Crocus sativus	Saffron	Memory enhancer, anti-depression, anti-inflammatory, anti-tumor, and radical-scavenging	[28,29]
Datura metel	Thorn apple	Analgesic, anti-spasmodic, antitussive, and bronchodilator	[30]
Delonix regia	Gulmohar	Wound healing, hepatoprotective, anti-inflammatory, anti-bacterial, and anti-malarial	[31,32]
Euphorbia neriifolia	Thor	Anti-anxiety, anticonvulsant, anti-oxidant, antiinflammatory, analgesic, anti-diabetic, aphrodisiacs, and hepatoprotective	[33]
Ficus hirta	Devil fig	Anti-oxidant, anti-inflammatory analgesic, and anti-bacterial	[34]
Ficus platyphylla	Flake rubber tree	Analgesic, anti-inflammatory, and anticonvulsant	[35]
Firmiana simplex	Chinese parasol tree	Anti-oxidant and hepatoprotective	[36,37]
Ginkgo biloba	Maidenhair tree	Anti-oxidant and treat cerebral hemorrhage	[38]
Gliricidia sepium	Gliricidia	Anti-bacterial, anti-fungal, and anti-oxidant	[39]
Lonchocarpus cyanescens	Indigo vine	Anti-oxidant, anti-anxiety, and anti-inflammatory	[40]
Morus alba	White mulberry	Anti-microbial, anti-oxidant, anti-HIV, neuroprotective, and anti-stress	[41]
Morinda citrifolia	Noni	Analgesic, anti-inflammatory, anti-oxidant, anti-tumor, hepatoprotective, anti-fungal, anxiolytic, and anti-epileptic	[42]
Ocimum sanctum	Tulsi	Analgesic, anti-inflammatory, anti-ulcer, anti-anxiety, anti-asthmatic, anti-fertility, anti-cancer, anticonvulsant, anti-diabetic, anti-hyperlipidemic, and anti-oxidant	[43]
Panax ginseng	American ginseng	Anti-sterility, anti-proliferative, adaptogenic, memory enhancing, anti-inflammatory, and anti-diabetic	[44]
Passiflora incarnata	Passion flower	Antitussive, anti-inflammatory, anti-asthmatic, anti-anxiety, anticonvulsant, analgesic, and aphrodisiac	[45]
Piper retrofractum	Long cavya	Mosquito larvicidal, anti-microbial, aphrodisiac, anti-hypertensive, and anti-fungal	[46,47]
Randia dumetorum	Emetic nut	Analgesic, anti-inflammatory, anti-allergic, and anti-bacterial	[48]
Rauwolfiatetraphylla	Devil pepper	Anti-bacterial, anti-diabetic, anti-viral, and aphrodisiac	[49]
Saccharum spontaneum	Sugar cane	Anti-bacterial, anti-fungal, cytotoxic, and anti-oxidant	[50]
Securinega virosa	Bushweed	Anti-diabetic, anti-oxidant, anti-rheumatism, anti-diarrheal, and anti-epileptic	[51,52]

Solanum nigrum	Black nightshade	Anticonvulsant, anti-cancer, anti-microbial, anti-ulcerogenic, and anti-inflammatory	[53]
Terminalia bellerica	Bahera	Analgesic, anti-inflammatory, anti-cancer, anti-depressant, anti-diabetic, anti-ulcer, anti-fertility, anti-hypertensive, anti-microbial, and anti-oxidant	[54]
Tetracarpidium conophorum	Nigerian walnut	Anti-oxidant, anti-microbial, anthelmintic, and anti-dote to snakebite	[55,56]
Thevetia peruviana	Lucky nut	Anti-microbial, antispermatogenic, anti-inflammatory, and anti-diarrheal	[57]
Tinospora cordifolia	Guduchi	Anti-microbial, anti-spasmodic, anti-inflammatory, anti-arthritis, anti-allergic, anti-diabetic, anti-stress, and anti-oxidant	[58]
Valeriana officinalis	All-Heal	Anxiolytic, anti-depressant, and anti-arrhythmic	[59]
Vitex negundo	Monk' pepper	Anti-inflammatory, analgesic, anticonvulsant, anti-oxidant, anti-gonorrhoeic, anti-arthritis	[60]
Withaniasomnifera	Ashwagandha	Anti-oxidants, anti-parkinson's, and anti-inflammatory	[61]

III. CONCLUSION

Schizophrenia is a chronic mental illness that affects more than 50 million people worldwide and is marked by positive symptoms (hallucinations, delusions), negative symptoms (social disengagement, flat affect, apathy), and issues with cognitive, social-cognitive, and social functioning. There is no consensus on the cause of schizophrenia, although it appears that biological and environmental variables have a role in the disorder's onset, progression, and outcome. Antipsychotic drugs are considered the first line of treatment and have been shown to be effective in lowering symptoms, particularly positive symptoms. Even with the extensive use of newer atypical medicines, however, medication adherence is low. Since the dawn of civilisation, plants have been utilised for treatment of variety of disease across the world. Because of their safety, economy, and effectiveness, there has been a surge in interest in the medicinal use of plants. Some plants have been mentioned in this review that have been previously investigated for their antipsychotic action by various researchers. Plant behavioural research have created a one-of-a-kind possibility for the development of newer antischizophrenic analogues. Herbal extracts and ingredients that are shown to have psychotherapeutic effects in animal models may be worth investigating further in clinical trials. This review confirms that herbal remedies are far more effective than allopathic medications in reducing antipsychotic activity. However, more neurochemical research is needed to learn more about herbal medications' true mechanism of action as a promising new antipsychotic agent.

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